

Model 5700-30

Model 5700-80

Laser Diode Drivers



Start Up Guide



Newport®

Experience | Solutions

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Part No. 90021080 rev A

Dear Customer,

This Start Up Guide contains essential information, including safety precautions and start up procedures, needed to get your new Laser Diode Driver up and running. Please review it prior to unpacking and powering up the instrument.

Other important information regarding the use and operation of the Laser Diode Driver is included in the complete User's Manual. The complete User's Manual in Adobe PDF format, and the instrument software drivers, are included on the accompanying CD. You can also view a copy of the User's Manual, and obtain the instrument software drivers, on the Newport web site.

In an effort to keep the Models 5700-30 and 5700-80 optimized for your applications, Newport will on occasion update existing and add new features to these instruments. To utilize this new functionality will require an update to the instruments' firmware, which can be easily accomplished by the user, as described in the User's Manual.

Please check the product page on the Newport web site (www.Newport.com) for newer versions of the firmware and the User's Manual. Call your local Newport application specialist if you need support with locating or downloading these files.

Enjoy your new instrument!

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Newport Corporation Calling Procedure

If there are any defects in material or workmanship or a failure to meet specifications, promptly notify Newport's Returns Department by calling 1-800-222-6440 or by visiting our website at www.newport.com/returns within the warranty period to obtain a **Return Material Authorization Number (RMA#)**. Return the product to Newport Corporation, freight prepaid, clearly marked with the RMA# and we will either repair or replace it at our discretion. Newport is not responsible for damage occurring in transit and is not obligated to accept products returned without an RMA#.

E-mail: rma.service@newport.com

When calling Newport Corporation, please provide the customer care representative with the following information:

- Your Contact Information
- Serial number or original order number
- Description of problem (i.e., hardware or software)

To help our Technical Support Representatives diagnose your problem, please note the following conditions:

- Is the system used for manufacturing or research and development?
- What was the state of the system right before the problem?
- Have you seen this problem before? If so, how often?
- Can the system continue to operate with this problem? Or is the system non-operational?
- Can you identify anything that was different before this problem occurred?

1 Getting Started

1.1 Unpacking and Handling

It is recommended that the Models 5700-30 and 5700-80 Laser Diode Drivers be unpacked in a lab environment or work site. Unpack the system carefully; small parts are included with the instrument. Inspect the box carefully for loose parts. You are urged to save the packaging material in case you need to ship your equipment in the future.

1.2 Inspection for Damage

The Models 5700-30 and 5700-80 Laser Diode Drivers are carefully packaged at the factory to minimize the possibility of damage during shipping. Inspect the box for external signs of damage or mishandling. Inspect the contents for damage. If there is visible damage to the instrument upon receipt, inform the shipping company and Newport Corporation immediately. Carefully open the box and save the shipping material for later use.



WARNING

Do not attempt to operate this equipment if there is evidence of shipping damage or you suspect the unit is damaged. Damaged equipment may present additional hazards to you. Contact Newport technical support for advice before attempting to plug in and operate damaged equipment.



CAUTION

The user is advised to save the packaging material in case the unit has to be shipped to a different location. The packaging material is specially designed to protect the unit during shipping.

1.3 Available Models

5700-30 30A, 5V Laser Diode Driver

5700-80 80A, 7.5V Laser Diode Driver

1.4 Parts List

The following is a list of parts included with the Models 5700-30 and 5700-80 Laser Diode Drivers:

1. Start Up Guide (Hardcopy).
2. CD with Software Drivers and Utilities, User's Manual, Start Up Guide.
3. D-sub connector with interlock jumper.
4. A pair of keys for the safety keyswitch.
5. IEC320 AC line cord with a NEMA 5-15P connector.

If you are missing any parts or have questions about the parts you have received, please contact Newport Corporation.

1.5 Choosing and Preparing a Suitable Work Surface

The Models 5700-30 and 5700-80 Laser Diode Drivers may be placed on any reasonably firm table or bench during operation. The unit may be mounted in a standard 19-inch rack provided that the primary support for the unit is a shelf within the rack. **DO NOT RACK-MOUNT THE UNIT USING ONLY THE FRONT PANEL EARS.**

1.6 Electrical Requirements

Before attempting to power up the unit for the first time, the following precautions must be followed:



WARNING

To avoid electric shock, connect the instrument to properly earth-grounded, 3-prong receptacles only. Failure to observe this precaution can result in severe injury.

- Have a qualified electrician verify the wall socket that will be used is properly polarized and properly grounded.
- Provide adequate distance between the Models 5700-30 Series and 5700-80 Series Laser Diode Drivers and adjacent walls for ventilation purposes. Do not let any other equipment blow hot air towards the Laser Diode Drivers. Verify the correct rated fuses are installed according to the fuse marking on the rear panel.
- The output cables, which connect the laser diode to the Models 5700-30 or 5700-80, must have the proper gauge according to the user application. The Models 5700-30 and 5700-80 can output high current, so it is recommended the cables to be 4 AWG for the 5700-80 model and 8 AWG for the 5700-30 model with a PVC jacket of minimum 105 °C rating. The user should check the local applicable codes for proper cable size and connections to ensure personal safety and system reliability.

1.7 Power Supplies

AC power is supplied through the rear panel AC power entry module connector that provides in-line transient protection and RF filtering. The power entry module also contains the mains power switch and the instrument's fuses.



WARNING

To avoid electric shock, connect the instrument to properly earth-grounded receptacles only. Failure to observe these precautions can result in fire, severe injury or death.



WARNING

To avoid electric shock, the appropriate fuses for the AC input power voltage must be installed in the instrument. Only qualified service personnel should replace fuses. Failure to observe these precautions can result in fire, severe injury or death.

2 System Operation



WARNING

Before operating the Models 5700-30 and 5700-80 Laser Diode Drivers, please read and understand all of Section 1 in the User's Manual.

2.1 Front Panel

The front panel of the Models 5700-30 and 5700-80 Laser Diode Driver is designed for easy operation. Seven distinct areas, each with a specific set of related functions, and a control knob are located on the front panel, as shown in Figure 1 below.



Figure 1 Front Panel Layout (5700-80 shown)

2.1.1 Control Switch

The Control Switch places the unit in Remote control mode. Each unit can operate in either Remote or Local control mode. In Remote control mode the instrument assumes that the USB interface has complete command control and thus the front panel Output ON switch, the Control pushbutton switch and the Control knob are ignored in that mode. Remote control mode prevents a user from changing settings or turning on the instrument output while under PC Remote control. The instrument is automatically placed in remote mode when the Newport Laser Diode Driver Application is launched and a USB cable is connected between the PC and the driver rear panel. The PC can return the instrument to Local control by sending the explicit Local command (see command section). The return to Local control mode cannot be done with the control switch.

2.1.2 OUTPUT ON Switch and Indicator

The switch will activate the ON LED and allow current flow to the laser diode after an approximately 3 second delay. Current will not flow unless the laser diode is correctly connected, the “LASER ENABLE” key switch is activated, and the interlock pins, pin 1 and 13 or pin 1 and 14 of the DB-25 I/O Signals Connector (located on the rear panel) are shorted together.

2.1.3 ERROR Indicator LED

The following conditions will cause the red ERROR LED and its protection circuitry to activate, automatically shutting off the output:

- a. An open circuit in the laser diode package or cabling.
- b. The forward voltage drop of a laser diode (or series arrangements of multiple diodes) exceeds the user set voltage limit, usually based on the product’s compliance voltage specification.
- c. Laser diode oscillation causing current to exceed the previously set current limit value.
- d. Certain external transient events that could damage the laser.

2.1.4 LIMIT Indicator LED

A soft limit occurs when the output current gradually exceeds a preset value, clamping the current flow at that level and causing the LIMIT LED to blink until the threshold is no longer exceeded.

ERROR LED	LIMIT LED	CONDITION
ON	ON	(Key switch in ON position) AND ((Rear panel Interlock de-asserted) OR (Rear panel External Disable asserted) OR (Compliance voltage exceeded) OR (Hard limit condition asserted))
BLINKING	BLINKING	Firmware download progress incomplete
OFF	BLINKING	Soft limit condition asserted by circuitry
OFF	OFF	No error condition detected

Table 1 Error and Limit LED Status Definition

2.1.5 Laser Enable

This key switch is a safety feature. The unit’s output current cannot be turned on, unless the key switch is turned on. The various Local and Remote control mode settings can be modified when the unit is powered up and the key switch is OFF, but attempts to enable output current via the USB interface or the Output ON switch will be rejected and an error message will be displayed. The key may only be removed in the OFF position.

2.1.6 Display Section

There are two front panel 4 digit green LED arrays. They show current in Amps and voltage in Volts. Pressing the current pushbutton switch repeatedly, cycles through display values as described below. Display modes can be toggled when the output is either ON or OFF or the unit is in Remote or Local Mode.

SETPOINT Display

This mode allows setting diode current levels with the control knob before actually turning on the output. The current setpoint corresponds to output laser diode current.

LIMIT SET Display

This mode allows setting diode current limit level with the control knob.

LD CURRENT Display

This readout measures actual current flow in Amps to the laser diode. The current level will drop to zero when the output is OFF.

FORWARD VOLTAGE Display

This readout measures the laser diode forward or compliance voltage. The current level will drop to zero when the output is OFF.

The Laser's forward voltage (V_f) is normally sensed at output terminals on the driver. It is not the actual V_f of the laser, the difference being the voltage drop in the cables due to the laser current.

Use the Anode and Cathode voltage sense inputs on the DB-25 I/O Signals Connector (located on the rear panel) to monitor the actual voltage across the laser diode. Note that it is necessary to send the HWCONFIG command via USB in order for the controller to monitor and display actual laser diode forward voltage on the front panel and via USB commands query.

2.1.7 Control Knob

Located on the right side of the front panel, this knob is used to set the appropriate drive current when the display is in either SETPOINT or LIMIT SET modes.

2.2 Rear Panel

The Model 5700-30 and 5700-80 rear panel has the OUTPUT terminals, I/O Signals connector, USB connector, and the AC power entry module.



Figure 2 Rear Panel

2.2.1 AC Power Switch

When AC power is turned on, the unit starts up in a default configuration with the OUTPUT off and the display in the SETPOINT mode. The power switch is part of the AC power entry module located on the right side of the instrument rear panel.

2.2.2 USB Interface

The instrument is designed to communicate with standard USB Host interfaces. The connector on the rear panel is a standard USB-B (Full-Size, Device).

2.2.3 Output Terminals

Connections to the laser diode are made with a pair of power studs with 1/4-20 thread. 1/4-20 nuts are supplied with the unit to match the output studs.

2.2.4 Chassis GND

This 4 mm banana jack is connected to chassis ground. It's intended to be used as an additional earth ground connection for the Laser Diode Driver enclosure.

2.2.5 AC Power Cord

All units are designed for 90-264VAC, 50/60 Hz operation. As such, they are rated for operation at 100VAC, 120VAC, 220VAC, and 240VAC mains voltages and 50 and 60 Hz mains frequency.

The line cord supplied with each unit should be plugged only into a properly grounded outlet to prevent electrical shock in the event of an internal short

circuit to the metal cabinet. The detachable line cord should be connected to the IEC320 connector on the power entry module.

2.2.6 Fuses

The correct fuses must be installed into the fuse holder that is part of the AC power entry module. Please check the fuse label on the rear panel, before installing new fuses.



WARNING

To avoid electric shock, the appropriate fuses for the AC input power voltage must be installed in the instrument. Only qualified service personnel should replace fuses. Failure to observe these precautions can result in fire, severe injury or death.

2.2.7 I/O Signals Connector

This DB-25 female connector provides access to various analog and digital input/output signals, as well as the instrument interlock signal. The signal pin assignments for this connector are shown in Table 2 below. Detailed information on these signals is provided in Section 4 of the User's Manual.

Pin No.	Name	Descriptions
1	Interlock+ (Input)	Additional safety. +5V (Digital) Pull Up. Can be connected to pins 13 or 14.
2	Fault (Output)	+5V TTL-Level Output
3	TTL (Input)	Used with gating and trigger features. +5V (Digital) Pull Up
4	TTL (Output)	Used with gating and trigger features. +5V TTL-Level Output
5	Output Disable (Input)	Low TRUE. Behaves similar to front panel ON button. +5V (Digital) Pull Up
6	Anode Sense (Input)	Differential Analog Input. Monitors LD voltage. Works in conjunction with pin 19.
7	Reserved	
8	Current Monitor (Output)	Differential Analog signal proportional to output current. Level 0-10V (into 10K load)
9	Voltage Monitor (Output)	Differential Analog signal equal to the compliance voltage. Level 0-Max Compliance Voltage (into 10K load)
10	Analog Control (Input)	Differential Analog signal. MPU sampled LD current setpoint command. Level 0 - 10V Analog, 10Hz (max) input. Requires USB command to activate.
11	Reserved	
12	Reserved	
13	Interlock (Return)	Digital Ground

14	Interlock (Return)	Digital Ground
15	Fault (Return)	Digital Ground
16	TTL Input (Return)	Digital Ground
17	TTL Output (Return)	Digital Ground
18	Output Disable (Return)	Digital Ground
19	Cathode Sense (Input)	Differential Analog Input. Monitors LD voltage. Works in conjunction with pin 6.
20	Reserved	
21	Current Monitor Output (Return)	Differential Analog Output.
22	Voltage Monitor Output (Return)	Differential Analog Output.
23	Analog Control Input (Return)	Differential Analog Input.
24	Reserved	
25	Chassis Ground	Chassis Ground

Table 2 I/O Signals Connector Pin Assignments

3 Software Application

3.1 Overview

The Model 5700-30 and 5700-80 Laser Diode Drivers have a USB interface to support communication between the driver and a host PC. The Newport Laser Diode Driver Application is designed to demonstrate this driver capability; it allows users to control the functions of the driver from a PC.

The installation files for this software application and the USB drivers required for USB communication can be found on the CD that accompanies the product.

3.2 Connection

When the Newport Laser Diode Driver Application is launched, it will automatically detect the presence of Laser Diode driver on the USB bus and start communicating with it. If there is more than one driver on the USB bus, the application is capable of communicating with up to 31 drivers. This can be done, provided the users ensure that each of these drivers has a unique USB address. Users can accomplish this by placing one driver at a time on the USB bus, using the software to change the driver's USB address from 2 (default) to a desired value and saving the new address in the driver's non-volatile flash memory.

The figure below shows the software communicating with an LED driver at USB address 2 (default).

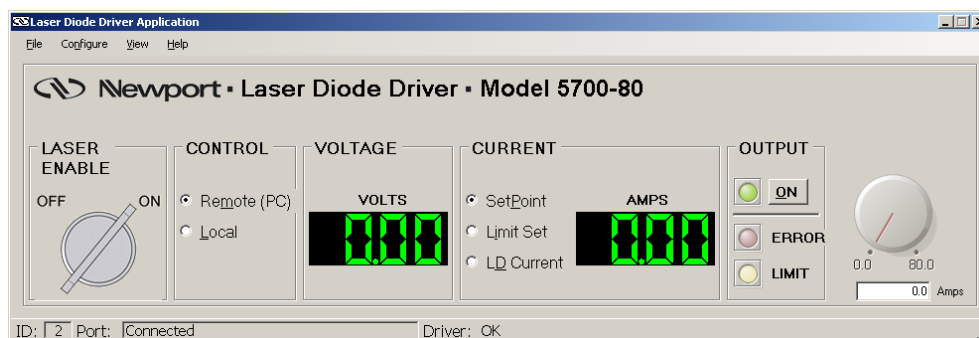


Figure 3 Application Front Panel

If the application does not detect the presence of any LED driver on the USB bus, the application front panel will look like the figure below:

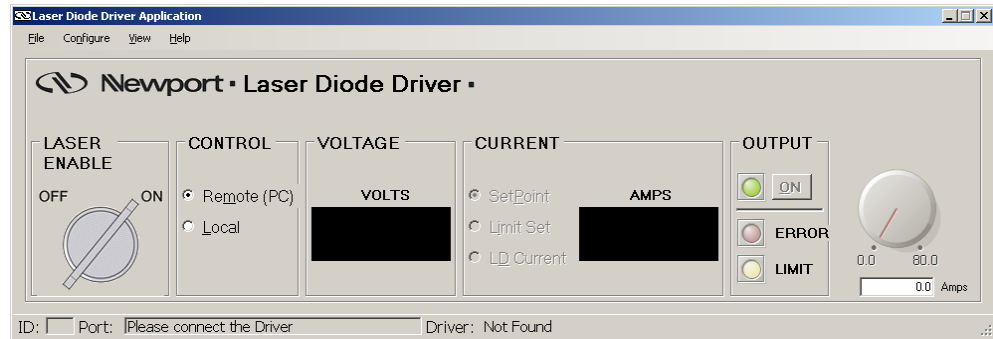


Figure 4 Application front panel without Laser Diode Drivers connected to PC over USB.

If there is more than one laser diode driver on the USB bus, users can switch communication between various drivers by doing the following:

1. Click on View menu and check the Terminal Command Window sub-menu to view the Terminal window.
2. Make sure the “Control Mode” is set to “Remote (PC)”
3. Select the desired laser diode driver from “USB ID:” drop-down menu.

3.3 General Usage

The Newport Laser Diode Driver Application provides a convenient GUI (Graphical User Interface) access to some of the key functions of the driver. For instance, the application’s front panel supports the following controls:

1. Knob control: This control mimics the real knob on the driver’s front panel. It allows the user to adjust the output current Setpoint or Limit Set (maximum current allowed). Note that the maximum current allowed should not exceed the current rating of the laser diode in use.
2. Control Mode: The radio buttons provided allow the users to select between “Local” and “Remote (PC)” operation modes. When the application is launched, it will automatically put the driver in Remote operation mode. All the menu and terminal window features are accessible to users only when the driver is in this mode.
3. Output ON: This LED mimics the real Output ON LED on the driver’s front panel.
4. Output Error: This LED mimics the real Output Error LED on the driver’s front panel.
5. Output Limit: This LED mimics the real Output Limit LED on the driver’s front panel.
6. Laser Enable Switch: This indicator shows the present status of the real Laser Enable switch on the driver’s front panel.

All the functions supported by the LED driver can be accessed through a “Terminal Command Window” as shown below.

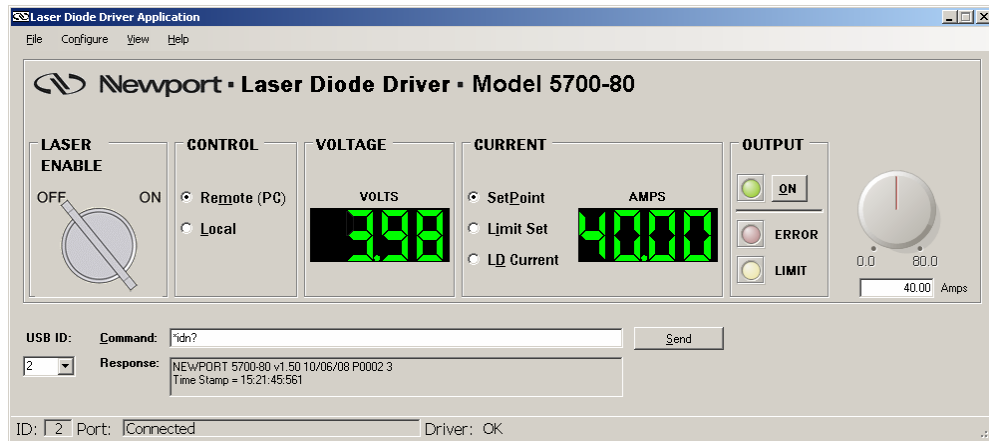


Figure 5 Application front panel with Terminal Command Window

Users can access this window by clicking on the View menu and checking the Terminal Command Window menu choice. This window is comprised of a USB ID (USB address) drop-down list, a Command text box, a Send button, and a Response text box.

The USB ID drop-down list allows the user to select which driver (if more than one is connected) to communicate with.

The Command text box is where the user enters ASCII commands. When a character is typed in the Command text box, the Auto-Complete list box is temporarily displayed. It contains a list of the commands that the user may enter into the Command text box. Pressing the Tab key or double-clicking a command will place the command into the Command text box. These commands can be sent to the driver by clicking the Send button or pressing the Enter key while the cursor is in the Command text box. The application will automatically read any response from the driver and display it in the Response textbox, if it detects that a query command was sent to the driver. It also provides a time stamp of the last query transaction for user convenience.

3.4 Menu Structure

The Configure menu has additional property settings, including options for current ramp settings. Users can adjust the current step size and the delay time between steps to obtain the desired output current ramp rate. Note that the output current is applicable only when the Laser Diode Driver is in “REMOTE” mode, and the desired output current is higher than the present output current. Refer “LAS:RAMP:I” and “HWCONFIG” command descriptions for further details in this regard.

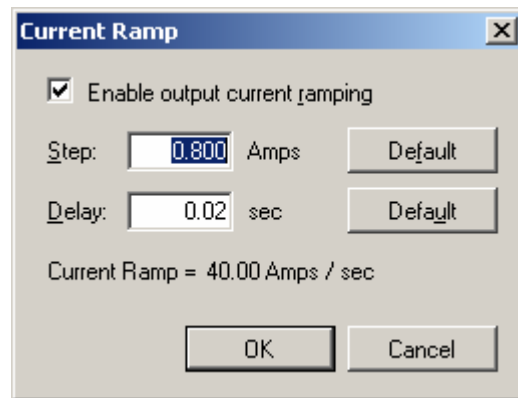


Figure 6 Current Ramp Window

Click on Help | User's Manual menu to open this manual installed on your PC during the software installation process.

Click on Help | Newport Website menu to open Newport's webpage and access the latest software / firmware / sample programs / user's manuals / application notes and other information related to this product.

Click on Help | About menu to open an About window as shown below.

Click on File | Download Laser Diode Firmware and follow the on-screen instructions to download firmware to the Laser Diode Driver.

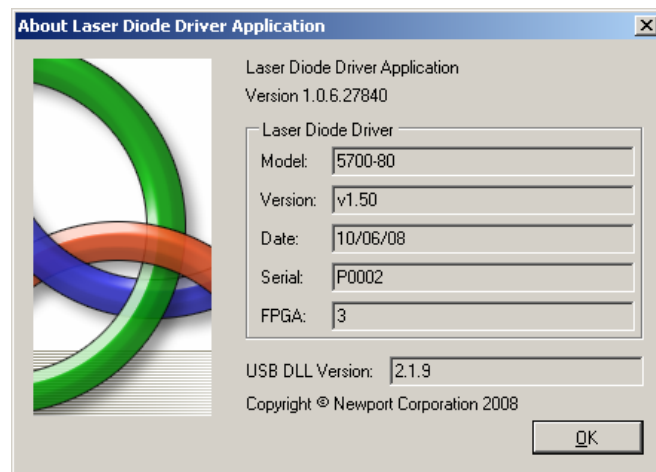


Figure 7 Application About Window

This window contains information about the application, Laser Diode Driver, and USB DLL used for USB communication with a host PC. To Exit the application go to the File menu and select Exit.

4 Maintenance and Service



WARNING

There are no user serviceable parts inside the Models 5700-30 and 5700-80 Laser Diode Drivers. Work performed by persons not authorized by Newport Corporation will void the warranty.

4.1 Enclosure Cleaning



WARNING

Before cleaning the enclosure of the Models 5700-30 and 5700-80 Laser Diode Drivers, the AC power cord must be disconnected from the wall socket.

The source enclosure should only be cleaned with a mild soapy water solution applied to a damp lint-free cloth. Do not use an acetone or alcohol solution; this will damage the finish of the enclosure.

4.2 Obtaining Service

The Models 5700-30 and 5700-80 Laser Diode Driver contains no user serviceable parts. To obtain information regarding factory service, contact Newport Corporation or your Newport representative. Please have the following information available:

1. Instrument model number (on the rear panel)
2. Instrument serial number (on rear panel or bottom of enclosure)
3. Description of the problem.

If the instrument is to be returned to Newport Corporation, you will be given a Return Number, which you should reference in your shipping documents. Please fill out a copy of the service form, located on the following page, and have the information ready when contacting Newport Corporation. Return the completed service form with the instrument.

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